

IN THE CLAIMS

1-35. (cancelled)

36. (currently amended) A linear monofunctional or multifunctional poly- α -amino-acid derivative having at least glutamic or aspartic or serinic repeating units in the polymer backbone, the said glutamic or aspartic or serinic repeating units having the formula:



wherein:

- R is defined as $-(\text{CH}_2)_n-$ CO - OR₁ or $-(\text{CH}_2)_n-$ CO - NHR₂ or CH₂OH,
- n is 1 or 2, - R₁ is selected from hydrogen, C₁₋₂₀ alkyl, polyhaloC₁₋₆alkyl, arylC₁₋₆ alkyl and heteroarylC₁₋₆ alkyl, and
- R₂ is C₁₋₆ alkyl substituted with at least one alcohol group,

characterized in additionally having a functional group at one or both ends of the polymer backbone, the said functional end group(s) being ~~other than alcohol selected from the group consisting of functionalized amines, N-acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, N-carboxyanhydride, oxycarbonyl, maleimide and any vinyl group suitable for radical, anionic or cationic polymerization.~~

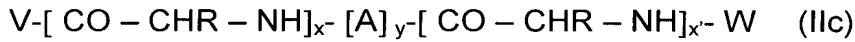
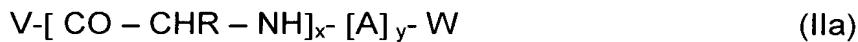
37. (cancelled)

38. (previously presented) A linear multifunctional poly- α -amino-acid derivative according to claim 36, having a functional group at both ends of the polymer backbone, and additionally having a single functional group as a side group.

39. (previously presented) A linear poly- α -amino-acid derivative according to claim 36, additionally comprising repeating units of one or more comonomer(s) copolymerizable with the α -amino-acid sequence containing glutamic or aspartic or serinic repeating units.

40. (previously presented) A linear poly- α -amino-acid derivative according to claim 36, additionally comprising repeating units of one or more comonomer(s) copolymerizable with the α -amino-acid sequence containing glutamic or aspartic or serinic repeating units, wherein the said co-monomer is selected from the group consisting of any naturally-occurring α -amino-acid other than glutamic acid, aspartic acid and serine and polymer blocks or sequences derived from ethylene oxide or propylene oxide or polyhydroxyalkanoates.

41. (previously presented) A linear poly- α -amino-acid derivative according to claim 36, being multifunctional and having any of the following formulae:

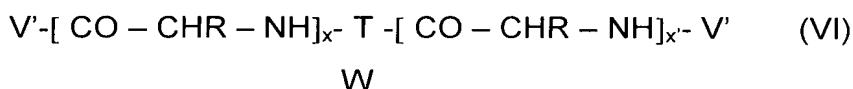
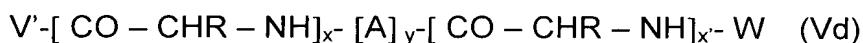
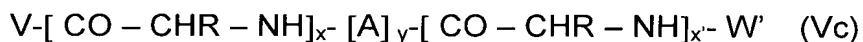
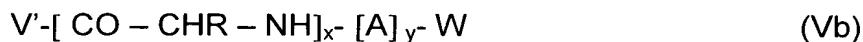
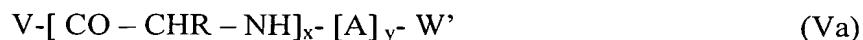


wherein:

- R is as defined in claim 36,

- x or, where applicable, x + x' range from 2 to 2,000,
- each of V and W independently represent a functional group,
- A is at least a co-monomer copolymerizable with the α -amino-acid sequence containing glutamic or aspartic or serinic repeating units,
- y ranges from 0 to 500,
- T is a spacing unit selected from lysine and ornithine, and
- V' is a non-reactive end group.

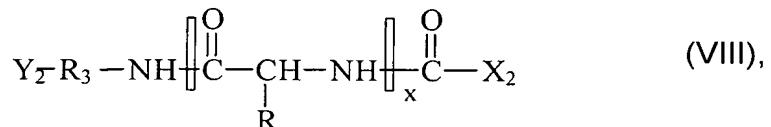
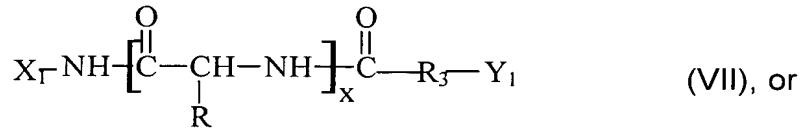
42. (previously presented) A linear poly- α -amino-acid derivative according to claim 36, being monofunctional and having any of the following formulae:



wherein:

- R is as defined in claim 36,
- x or, where applicable, x + x' range from 2 to 2,000, and
- each of V and W independently represent a functional group,
- A is at least a co-monomer copolymerizable with the α -amino-acid sequence containing glutamic or aspartic or serinic repeating units,
- y ranges from 0 to 500,
- T is a spacing unit selected from lysine and ornithine, and
- V' and W' are non-reactive end groups.

43. (previously presented) A linear poly- α -amino-acid derivative according to claim 36, having at least one protective end group and being represented by the following formulae:

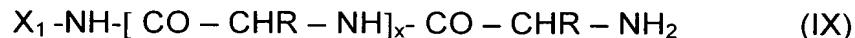


wherein:

- R is $-(CH_2)_n-CO-NHR_2$,
- R_2 and n are as defined in claim 36,
- x ranges from 2 to 2,000,
- X_1 is $-R_4-Z_1-A_1$,
- each of R_3 and R_4 is independently selected from $(CH_2)_m$, arylene, C_{1-6} alkylarylene and aryl C_{1-6} alkylene,
- m is from 2 to 20,
- Y_1 is $-Z_2-A_2$,
- X_2 is $-R_4-Z_3-A_3$ or $-O-R_4-Z_3-A_3$,
- Y_2 is $-Z_4-A_4$,
- each of Z_1 , Z_2 , Z_3 and Z_4 is independently selected from NH, O, S, $C(O)O$, $C(S)O$, CO, CS, -OCH-O- and $C=N-R_5$,
- each of A_1 , A_2 , A_3 and A_4 is a protective group suitable for Z_1 , Z_2 , Z_3 and Z_4 respectively, and

- R_5 is selected from hydrogen, C₁₋₆ alkyl, aryl and C₁₋₆ alkylaryl, heteroaryl and C₁₋₆ alkylheteroaryl.

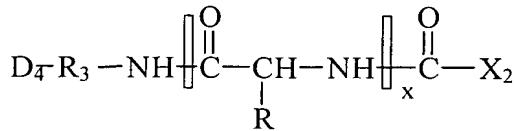
44. (currently amended) A linear poly- α -amino-acid derivative according to claim 36, being represented by the formula:



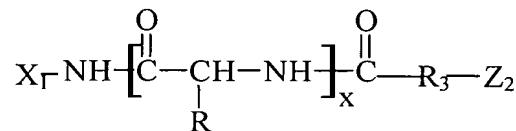
wherein:

- X_1 is $-R_4-Z_1-A_1$,
- R_4 is selected from the group consisting of (CH₂)_m, arylene, C₁₋₆ alkylarylene and arylC₁₋₆ alkylene,
- m is from 1 to 20,
- x ranges from 2 to 2,000,
- R is defined as -(CH₂)_n- CO - OR₁,
- R₁ and n are as defined in claim 36,
- Z₁ is selected from the group consisting of NH, O, S, C(O)O, C(S)O, CO, CS, -OCH-O- and C = N - R₅,
- A₁ is a protective group suitable for Z₁, and
- R₅ is selected from the group consisting of hydrogen, C₁₋₆ alkyl, aryl, C₁₋₆ alkylaryl, heteroaryl and C₁₋₆ alkylheteroaryl.

45. (currently amended) A linear poly- α -amino-acid derivative according to claim 36, being represented by any of the respective formulae:



(X), and



(XI), wherein:

- R is $-(CH_2)_n-$ CO – NHR₂,
- R₂ and n are as defined in claim 36,
- x ranges from 2 to 2,000,
- X₁ is $-R_4 - Z_1 - D_1$,
- each of R₃ and R₄ is independently selected from the group consisting of (CH₂)_m, arylene, C₁₋₆ alkyl-arylene and aryl-C₁₋₆ alkylene,
- m is from 2 to 20,
- each of R₃ – Y₁ and R₃ – Y₂ ~~may be is~~ a group including a vinyl terminal moiety,
- X₂ is $-R_4 - Z_3 - D_3$,
- each of Z₁, Z₂, Z₃ and Z₄ is independently selected from the group consisting of NH, O, S, C(O)O, C(S)O, CO, CS, -OCH-O- and C = N – R₅,
- each of D₁, D₂, D₃ and D₄ is independently selected from the group consisting of hydrogen, aryl, heteroaryl, succinimidyl, vinyl and C₁₋₆ alkylcarbonyl,
- each of Z₁ – D₁, Z₂ – D₂, Z₃ – D₃ and Z₄ – D₄ ~~may be is~~ independently selected from the group consisting of maleimidyl, disulfide, α -haloacetoxy and C₁₋₆ alkyloxymethylsulfide, and

- R_5 is selected from the group consisting of hydrogen, C₁₋₆ alkyl, aryl, C₁₋₆ alkyl-aryl, heteroaryl and C₁₋₆ alkyl-heteroaryl.

46. (currently amended) A process for making a linear monofunctional or multifunctional poly- α -amino-acid derivative having at least glutamic or aspartic or serinic repeating units in the polymer backbone and additionally having a functional group at one or both ends of the polymer backbone, the said functional end group(s) being ~~ether than alcohol~~ selected from the group consisting of functionalized amines, N-acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, N-carboxyanhydride, oxycarbonyl, maleimide and any vinyl group suitable for radical, anionic or cationic polymerization, said process including a step comprising polymerizing a monomer or mixture of monomers comprising at least the N-carboxy anhydride of an amino-acid selected from the group consisting of glutamic acid, aspartic acid, serine and oxygen-protected serine, wherein said polymerization is effected in the presence of an effective amount of a multifunctional initiator containing at least one primary amino group and further containing at least another functional group selected from maleimide, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, oxycarbonyl, vinyl, ester, carbonate, thiol precursor, protected amine and protected carboxylic acid and/or in the presence of an effective amount of a bi-functional terminating reagent.

47. (previously presented) A process according to claim 46, further including aminolysis of the pending group of the glutamic, aspartic or serinic repeating

- R_3 is selected from the group consisting of $(CH_2)_m$, arylene, C_{1-6} alkylarylene and aryl C_{1-6} alkylene,
- m is from 2 to 20,
- Y_2 is $-Z_4-A_4$,
- Z_4 is selected from the group consisting of NH, O, S, C(O)O, C(S)O, CO, CS, -OCH-O- and $C=N-R_5$,
- A_4 is a protective group suitable for Z_4 , and
- R_5 is selected from the group consisting of hydrogen, C_{1-6} alkyl, aryl, C_{1-6} alkylaryl, heteroaryl and C_{1-6} alkylheteroaryl.

50. (currently amended) A biodegradable article containing a copolymer comprising at least a moiety derived from a linear monofunctional or multifunctional poly- α -amino-acid derivative having at least glutamic or aspartic or serinic repeating units in the polymer backbone and additionally having a functional group at one or both ends of the polymer backbone, the said functional end group(s) being ~~ether than alcohol~~ selected from the group consisting of functionalized amines, N-acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, N-carboxyanhydride, oxycarbonyl, maleimide and any vinyl group suitable for radical, anionic or cationic polymerization, provided that and wherein the said functional end group(s) is an unsaturated group.

51. (presently presented) A poly- α -amino-acid derivative according to claim 36, containing a L-amino-acid sequence and being enzymatically degradable.

52. (currently amended once) A linear mono-functional or multifunctional poly- α -amino-acid derivative according to claim 36, having at least glutamic or aspartic or serinic repeating units in the polymer backbone, the said glutamic or aspartic or serinic repeating units having the formula:



wherein:

- R is defined as $-(\text{CH}_2)_n-\text{CO}-\text{OR}_1$ or $-(\text{CH}_2)_n-\text{CO}-\text{NHR}_2$ or CH_2OH ,
- n is 1 or 2,
- R_1 is selected from the group consisting of hydrogen, C_{1-20} alkyl, polyhalo- C_{1-6} alkyl, aryl- C_{1-6} alkyl and heteroaryl- C_{1-6} alkyl, and
- R_2 is C_{1-6} alkyl substituted with at least one alcohol group,
said poly- α -amino-acid derivative additionally having a functional group at one
or both ends of the polymer backbone, said functional end group(s) being other
than alcohol, said poly- α -amino-acid derivative containing a D-amino-acid
sequence [[,]] and being non-degradable, for the surface modification of a
biomaterial.

53. (currently amended) The product of coupling a biomolecule with a linear monofunctional or multifunctional poly- α -amino-acid derivative having at least glutamic or aspartic or serinic repeating units in the polymer backbone and additionally having a functional group at one or both ends of the polymer backbone, the said functional end group(s) being ~~other than alcohol~~ selected from the group consisting of functionalized amines, N-acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde,

acetal, N-carboxyanhydride, oxycarbonyl, maleimide and any vinyl group suitable for radical, anionic or cationic polymerization.

54. (presently presented) The product of claim 53, wherein the said biomolecule is selected from the group consisting of therapeutic agents, prophylactic agents, diagnostic agents, proteins, peptides, hormones, antibodies and fragments thereof, oligonucleotides, plasmids, DNAs, interleukins, interferons and enzymes and fragments thereof.
55. (currently amended) A synthetic polymer for a polymer-based carrier vehicle or vector for delivery of DNA or other nucleic acid material to target cells in a biological system, comprising a linear monofunctional or multifunctional poly- α -amino-acid derivative having at least glutamic or aspartic or serinic repeating units in the polymer backbone and additionally having a functional group at one or both ends of the polymer backbone, the said functional end group(s) being ~~ether than alcohol~~ selected from the group consisting of functionalized amines, N- acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, N- carboxyanhydride, oxycarbonyl, maleimide and any vinyl group suitable for radical, anionic or cationic polymerization.
56. (presently presented) A synthetic polymer for a polymer-based carrier vehicle or vector according to claim 55, further comprising a synthetic vector component such as polyethyleneimine, poly-L-lysine, a star-shaped dendrimer or chitosan.

57. (currently amended) A method of treatment of a patient in need of such treatment, comprising administration to said patient of a biologically-active ingredient modified by or a nucleic acid material carried by a polymer system comprising a linear monofunctional or multifunctional poly- α -amino-acid derivative having at least glutamic or aspartic or serinic repeating units in the polymer backbone and additionally having a functional group at one or both ends of the polymer backbone, the said functional end group(s) being ~~ether than alcohol~~ selected from the group consisting of functionalized amines, N-acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, N-carboxyanhydride, oxycarbonyl, maleimide and any vinyl group suitable for radical, anionic or cationic polymerization.

58. (new) A linear mono-functional or multifunctional poly- α -amino-acid derivative according to claim 52, wherein said functional end group(s) are selected from the group consisting of functionalized amines, N-acyl, ester, carbonate, thiol, thiol precursor, thioisocyanate, thiocarbonate, urea, thiourea, aldehyde, acetal, N-carboxyanhydride, oxycarbonyl, maleimide.